National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Analyzing various agricultural wastes in comparison to determine their suitability as substrates for direct ethanol fermentation
Speaker	: Dr. Angana Sarkar
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Venue	: BM Department Seminar Room
Date and Time	: 19 May 2025 (04:30 PM)
Abstract	: Over the past 20 years, the majority of research on bioethanol fermentation substrates has focused on substrate pretreatment, ignoring the growth-inhibitory elements of waste substrates. Since the current study focused on direct bioethanol fermentation, the impact of growth inhibitory components would be a crucial criterion. Five distinct biomass types: banana peel, corncob, potato peel, sugarcane bagasse, and orange peel were taken into consideration in this investigation. Several growth-inhibiting compounds, including cyanide, phytate, tannin, oxalate, and phenolic acids, were discovered to be present in these chosen biomasses. Among the chosen growth-inhibitory components, phytate showed the strongest growth-inhibitory effect (3.09% reduction produced by each 1 µg/mL of phytate). It was discovered that the majority of the chosen growth inhibitors had an impact on membrane function in addition to several metabolisms, such as the proton transport system, protein translation, and the metabolic of fatty acids and nitrogen. Banana peel had the lowest growth inhibitory effect on bacterial strain SWET4 and promoted maximal growth despite having high levels of cyanide, phenolic acid, and tannin due to its lowest phytate content. Furthermore, according to the analysis of ethanol production capacity, 1 g of dried banana peel has the potential to yield 0.04 g to 0.21 g of ethanol. This anticipated productivity was determined to be adequate to meet India's targeted ethanol demand due to the country's abundance of bananas. Keywords: Ethanol, Agro-waste, Direct fermentation, Bacteria, Growth inhibition ALL ARE CORDIALLY INVITED